THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 9

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MASAO NAKAO, HIROAKI FURUKAWA,
RYOHKAN YUASA and SHUJI FUJIWARA

Appeal No. 96-1701
Application 08/190,211[1]

ON BRIEF

Before KIMLIN, JOHN D. SMITH and GARRIS, Administrative Patent Judges.

JOHN D. SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal pursuant to 35 USC § 134 from the final rejection of claims 1, 3, 5 through 8, 14, and 15. Claims 9, 10, and 12 stand withdrawn from further consideration as directed to a non-elected invention. Claims 2, 4, 11, and 13 have been cancelled.

[1] Application for patent filed February 1, 1994. According to appellants, the application is a continuation of Application 07/861,193, filed March 31, 1992. (ABN)

Appealed claim 1 is representative and is reproduced below:

1. A method of forming a Josephson junction device comprising the steps of:

forming a non-superconducting oxide film of Bi-Sr-Cu-O compound by sequentially depositing at least Bi, Sr and Cu on a magnesia substrate in a pattern;

and forming a superconducting oxide film of Bi-Sr-Ca-Cu-O compound by sequentially depositing at least Bi, Sr, Ca and Cu over the exposed part of said magnesia substrate and said non-superconducting oxide film to form a tilt-boundary junction between said superconducting oxide film on said magnesia substrate and said superconducting oxide film on said non-superconducting oxide film.

The references of record relied upon by the examiner are:

Char et al. (Char) 5,157,466 Oct. 20, 1992

Vasquez et al. (Vasquez), Appl. Phys. Lett., ?Nonaqueous chemical depth profiling of $Yba_2Cu_3O_{7-x}$?, Vol. 54, No. 11, pages 1060-1062 (1989).

Mizuno et al. (Mizuno), Appl. Phys. Lett., ?Fabrication of thin-film-type Josephson junctions using a Bi-Sr-Ca-Cu-O/Bi-Sr-Cu-O/Bi-Sr-Ca-Cu-O structure?, Vol. 56, No. 11, pages 1469-1471 (1990).

Tsukamoto et al. (Tsukamoto), Japanese Journal of Applied Physics, ?Low-Temperature Annealing Effect on Bi-Sr-Ca-Cu-O Thin Films Prepared by Layer-by-Layer Deposition?, Vol. 30, No. 5A, pages L830-L833 (1991).

Tsukada et al. (Tsukada), Supercond. Sci. Technol., ?In-situ of Bi-Sr-Ca-Cu-O films by shutter-controlled molecular beam epitaxy?, 4, pages 118-120 (1991).

Claims 1, 3, 5, 6, 14, and 15 stand rejected under 35 USC § 103 over Char in view of Mizuno, Tsukamoto, and Tsukada. Claims 7 and 8 stand similarly rejected under the same section of the statute further in view of Vasquez.

We reverse.

The subject matter on appeal is directed to a specific and limited method for forming a Josephson junction device having a tilt-boundary junction between a superconducting oxide film of a Bi-Sr-Ca-Cu-O compound (referred to as BSCCO) on a magnesia substrate and the same film (BSCCO) on a non-superconducting oxide film of Bi-Sr-Cu-O (referred to as BSCO) deposited in a pattern on the magnesia substrate. Each of the films must be sequentially deposited. Thus, for the BSCO film, bismuth, strontium, and copper are sequentially deposited in that order. For the BSCCO film, bismuth, strontium, calcium, and copper are sequentially deposited in that respective order.

We have carefully reviewed the prior art references relied upon by the examiner and the examiner's stated rejections based on these references. Although the examiner's position is not without merit, we agree with appellants that the relied upon prior art disclosures are insufficient to establish a prima facie case of obviousness for the claimed subject matter. Hence we

reverse the examiner's rejections.

The examiner contends (Answer, page 5) that from the broad disclosures discussing Char's Figure 3 embodiment, one of ordinary skill in this art would have recognized that a tilt-boundary junction could be formed by depositing BSCO on a bicrystal structure composed of BSCO/MgO when using BSCO as a seed layer. However, there is no teaching in the relied upon prior art references of a patterned BSCO film formed on a magnesia substrate, much less the recognition that such a structure would form a bicrystal as required by Char's Figure 3 embodiment. Moreover, Char's only exemplified embodiment involves the formation of a junction by growing a seed layer of $YBa_2Cu_3O_7$ (referred to as YBCO) under one set of growth conditions followed by growing another layer of YBCO under different growth conditions to achieve two different crystal orientations. Thus Char uses the same film material, i.e., YBCO, to form both films on a substrate, while appellants use a BSCO/BSCCO film combination.

In light of the above, it is apparent that adequate factual support for the examiner's obviousness conclusion is not of

record. Thus the examiner's rejections of the appealed claims are reversed.

REMAND

At page 2 of the Brief, appellants indicate that Application 08/036,148 is related to the present application and that an appeal (Appeal No. 96-1673) has been taken therein. In light of the closely related subject matter claimed in application 08/036,148, this application is remanded to the examiner to determine whether or not a rejection of the herein claimed subject matter should be made on the grounds of provisional obviousness-type double patenting. A copy of our decision in Appeal No. 96-1673 issued concurrently, is attached.

REVERSED and REMANDED

EDWARD C. KIMLIN)
Administrative Patent Judge)

	) BOARD OF PATENT
JOHN D. SMITH	)
Administrative Patent Judge	) APPEALS AND
	)
	) INTERFERENCES
	)
BRADLEY R. GARRIS	)
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